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(56) Documents Cited

GB 2242407 A CA 001291004 A
US 5288334 A US 4889147 A
DE 3026388 A (Riederer) 04.02.82 (see figure 1, WPI
abstract accession number 1982-B3057E [06] and last
paragraph page 17)
JP 6329002 A (Chiko) 29.11.94 (see all figures and
enclosed PAJ abstract)

(58) Field of Search

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Other: ONLINE: WPI, PAJ, EPODOC

(54) Abstract Title

Apparatus for disinfecting the underside of a vehicle

(57) An apparatus for facilitating the cleaning and disinfecting of the underside and/or suspension of a vehicle comprises an array of upwardly directed nozzles 100, positioned transversely of a carriageway, means for supplying a disinfectant fluid to the nozzles 100 and means for sensing 106 the approach of a vehicle thereby initiating the supply of disinfectant solution and means for sensing 107 the completion of the passage of the vehicle over the nozzles 100 thereby terminating the supply of disinfectant solution. The sensing means 106,107 may either be in the form of light sensors or pressure transducers. There is preferably a means for reducing the speed of the vehicle as it passes over the nozzles 100, this maybe in the form of a double ramp 101. The apparatus maybe independent of electricity and/or water or it maybe connected to the mains supply. A solenoid valve 408 is preferably present in the outlet pipeline of the pump 404.

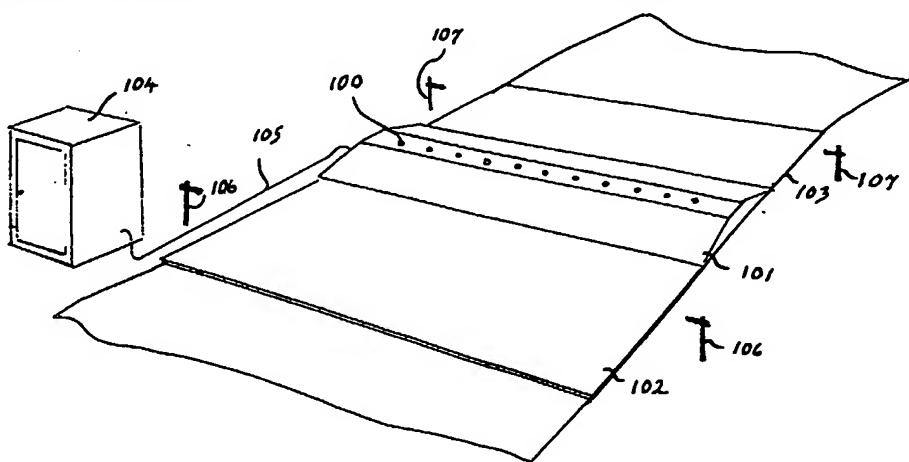


Fig 1

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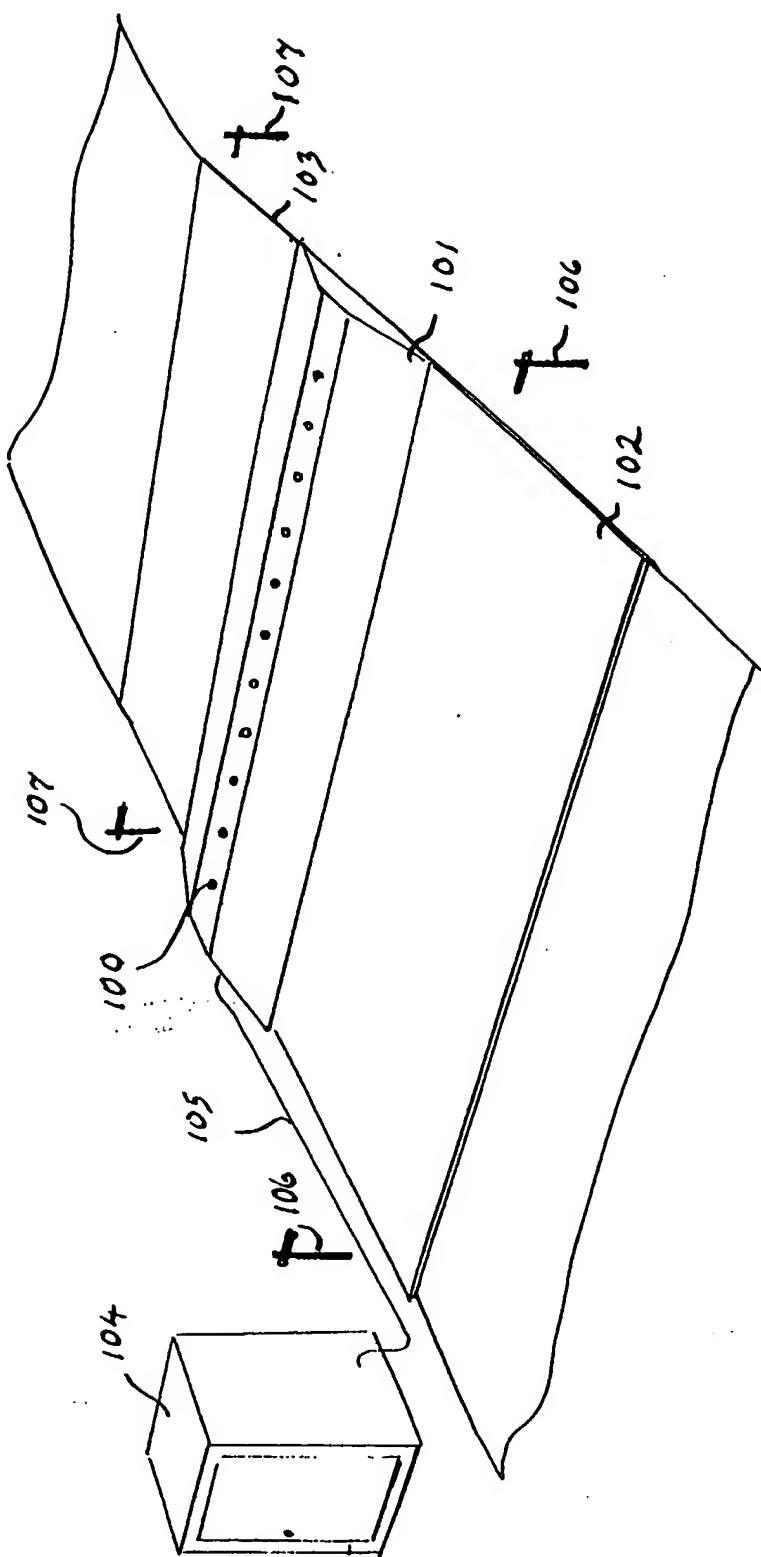


Fig 1

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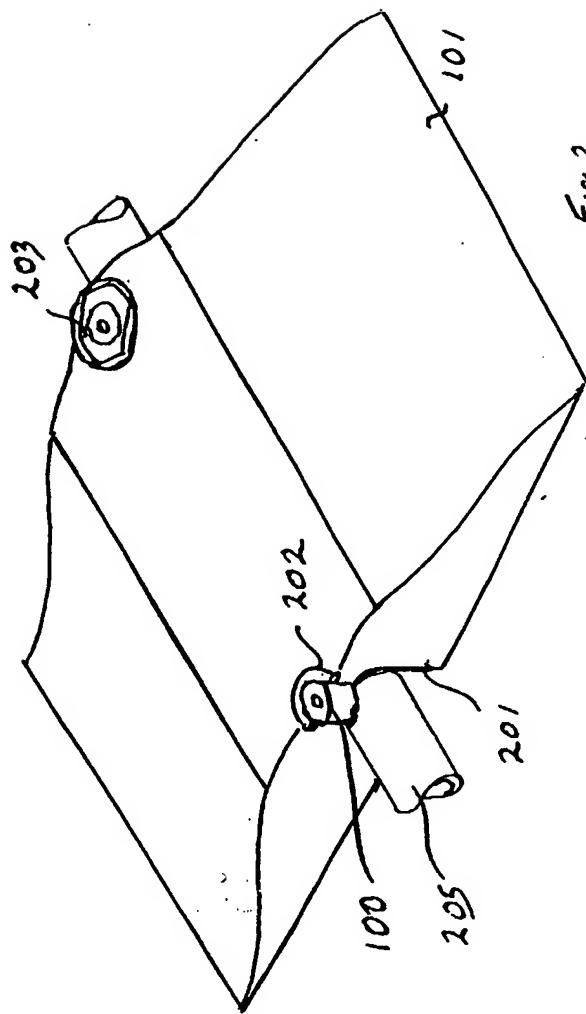


Fig. 2

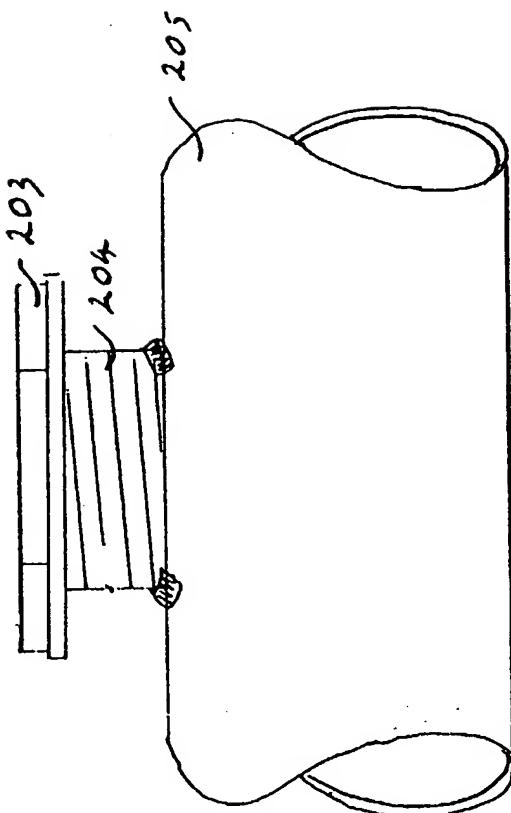
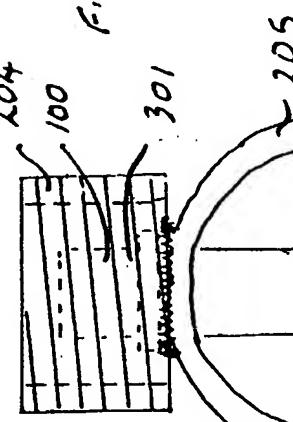
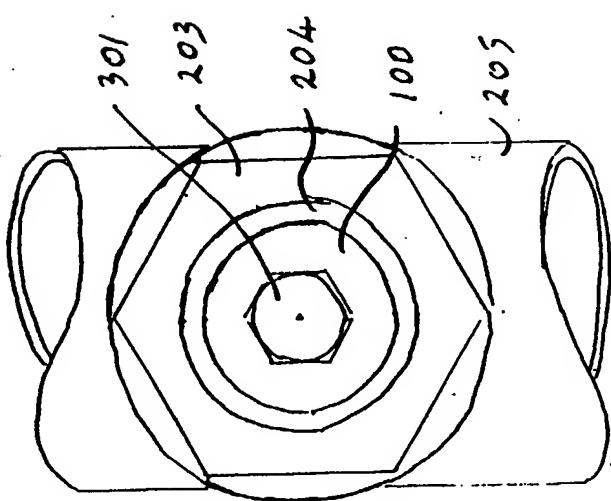
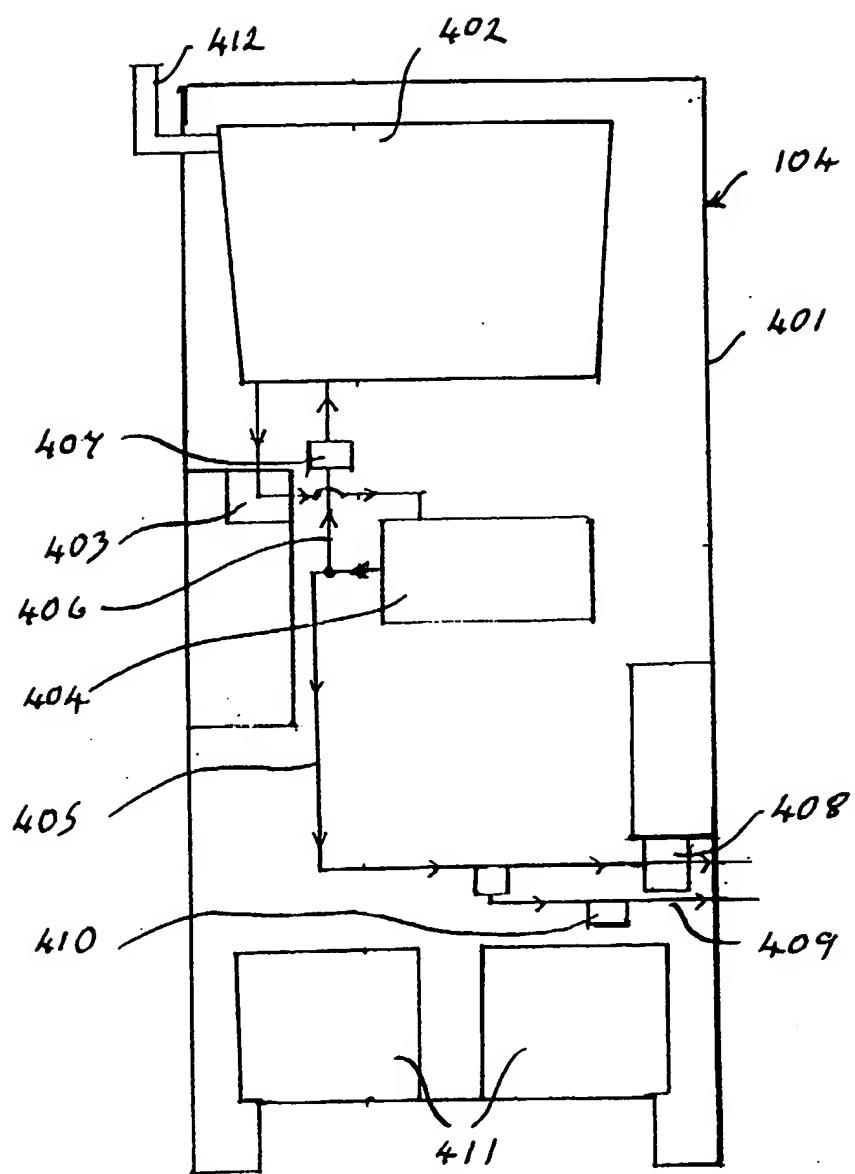


Fig. 3



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Fig 4



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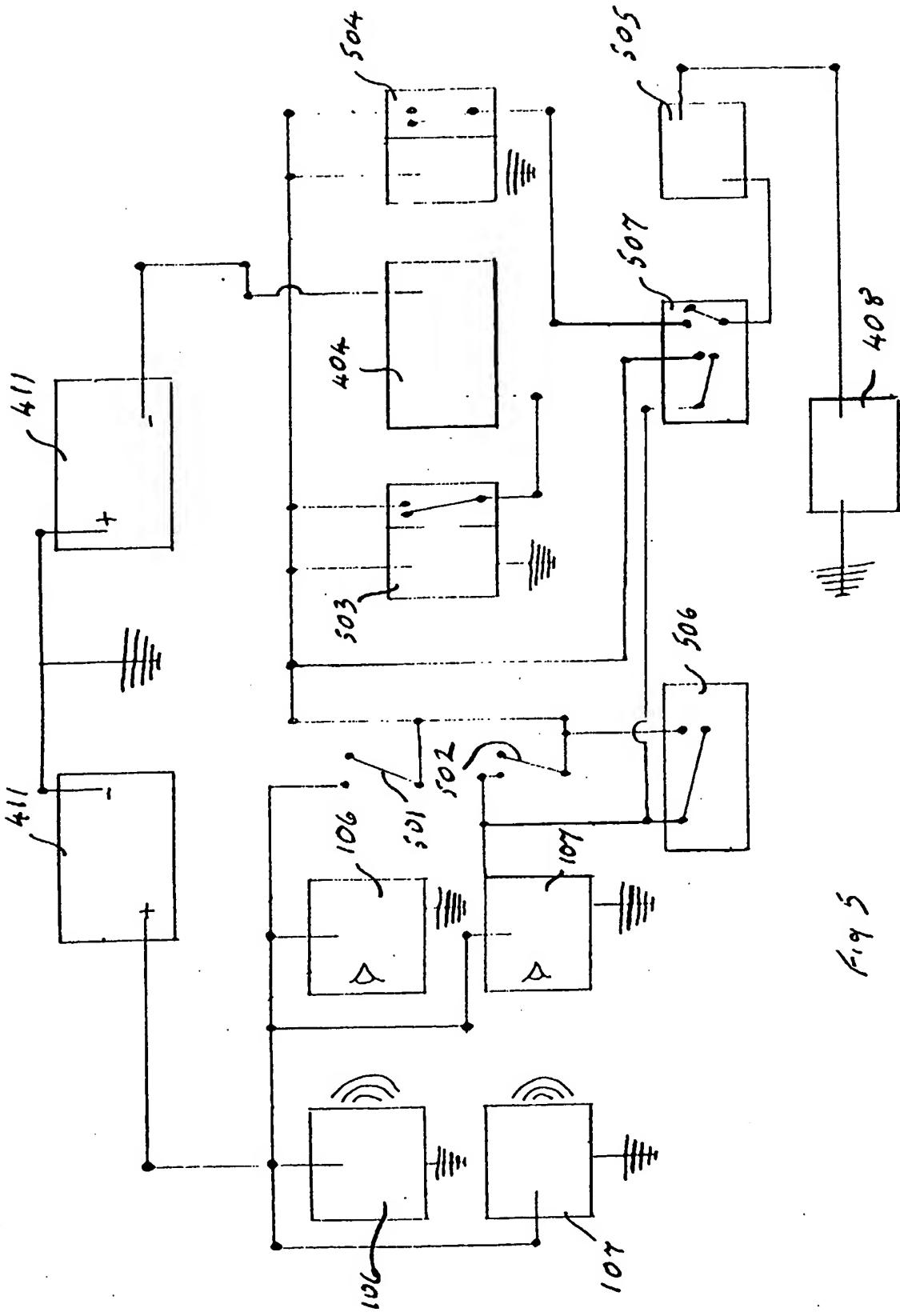


Fig. 5

VEHICLE DISINFECTION APPARATUS

The present invention relates to an apparatus for disinfecting the underside of vehicles.

5

Circumstances arise where there is a risk that contagious diseases or infection, such as 'foot & mouth' disease in cloven-hoofed animals, swine fever in pigs, or fowl pest in chickens, will be transmitted from place to place by vehicles travelling between the places concerned. At present, attempts are made to disinfect the outside of vehicles.

10 by means of hand-held pressure sprays. It is relatively simple to hose down the exterior of vehicles, but to do the job properly with respect to the suspension components and the undersides of vehicles is a difficult and time-consuming operation.

15 It is an object of the present invention to provide an apparatus adapted to facilitate the disinfection of the undersides and suspensions of vehicles.

According to the present invention there is provided in one aspect an apparatus for facilitating the disinfection of the underside and/or suspension of a vehicle,
20 comprising an array of upwardly directed atomising nozzles, positioned transversely of a carriageway, means for supplying a disinfectant fluid to the atomising nozzles, means for sensing the approach of a vehicle to the atomising nozzles and initiating the supply of disinfectant fluid to the atomising nozzles and means for sensing the completion of the passage of the vehicle over the array of atomising nozzles and
25 terminating the supply of disinfectant fluid to the array of atomising nozzles.

According to the invention in a second aspect there is provided an apparatus for facilitating the disinfection of the underside and/or suspension of a vehicle including means for positioning an array of upwardly directed atomising nozzles transversely of a carriageway, means for supplying a disinfectant fluid to the array of disinfecting nozzles, means for sensing the approach of a vehicle to the array and initiating the supply of disinfectant fluid to the atomising nozzles and means for sensing the completion of the passage of the vehicle over the array of atomising nozzles and terminating the supply of disinfectant fluid to the array of atomising nozzles.

Preferably the disinfectant fluid is supplied to the atomising nozzles at a pressure such
5 that it emerges from the atomising nozzles in the form of a mist and there is included
means for reducing the speed of the vehicle as it passes over the array of atomising
nozzles so as to ensure that both the underside and the suspension units of the vehicle
are thoroughly wetted with the disinfectant fluid.

10 In particular, the array of atomising nozzles may be incorporated into a linearly
extending double ramp such as are used to provide protection for cables which are
extended temporarily across carriageways. Such ramps incorporate a central channel
for the cable, or cables, to be protected and this provides a convenient place to house
the atomising nozzles and their associated pipework.

15 More permanently, the array of atomising nozzles can be incorporated into the fixed
double ramps known colloquially as speed bumps, or sleeping policemen, and the
means for reducing the speed of a vehicle as it approaches the array of atomising
nozzles may comprise one of the said double ramps or further speed bumps positioned
20 either side of the array of atomising nozzles.

Preferably, the means for sensing the approach of a vehicle to the array of atomising
nozzles and the completion of its passage over the said nozzles comprises a photo-
electric cell and opposed light source positioned on either side of the array of
25 disinfecting nozzles and so arranged that the interruption of one beam of light initiates
the supply of disinfectant fluid to the array of atomising nozzles and the clearance of
the other beam of light terminates the supply of disinfectant fluid to the atomising
nozzles, the system being such that the same sequence of operations occurs whichever
direction the vehicle is travelling. If so desired the photo-electric detectors can be
30 replaced by a pneumatic or hydraulic sensor system.

The invention will now be described, by way of example, with reference to the
accompanying drawings in which:

Figure 1 is a schematic view of an embodiment of the invention.

5

Figure 2 is a view of a section of a linear array of atomising nozzles incorporated in the embodiment of Figure 1.

10 Figure 3 is a plan, elevation and cross-sectional view of a single atomising nozzle assembly incorporated in the embodiment of Figure 1.

Figure 4 is a schematic control assembly for use with the embodiment of Figure 1, and

15 Figure 5 is a block diagram of an electrical control system for use with the embodiment of Figure 1.

Referring to Figure 1 of the drawings, an apparatus for disinfecting the underside of a vehicle consists of a linear array of atomising nozzles 100 which are incorporated into 20 a double ramp 101 which serves both to provide a protective mounting for the nozzles 100 and to cause a driver of a vehicle to drive slowly over the array of nozzles 100. Further speed-reducing double ramps may be used if so required. Absorbent mats 102 and 103 are positioned on either side of the double ramp 101, these both absorb 25 disinfectant liquid draining from the nozzles 101 and the underside of a vehicle passing over the array of nozzles 100 and act to apply disinfectant to the treads of the wheels of the vehicle. The length of the mats 102, 103 in the direction of travel of the vehicle are such that at least one revolution of the wheels of the vehicle is made as they pass over the mats 102, 103. The nozzles 101 are supplied with disinfectant fluid from a reservoir (not shown in the drawing) which is included in a trackside control 30 box 104, via a pipeline 105. Also connected to the control box 104 are two interrupted-beam photo-electric detectors 106 and 107. The detectors 106 and 107 are situated on either side of the of the array of nozzles 100. The photo-electric detectors

106 and 107 are so arranged that, whichever direction a vehicle approaches the array
5 of nozzles 100, the interruption of the nearer light beam starts the supply of
disinfectant fluid to the nozzles 100 and the clearance of the further light beam stops
the supply of disinfectant fluid to the nozzles 101.

Referring to Figure 2 the arrangement of the nozzles 100 in the double ramps 101 is
10 shown in greater detail. The double ramp 101 has a central channel 201 formed in its
underside and an array of holes 202 through each of which a nozzle 100 passes and is
held with its outlet approximately flush with the upper surface of the double ramp 101
by means of a nut 203 which screws onto an outer shroud 204 of the nozzles 100 and
is housed in a recess in the upper surface of the double ramp 101. A manifold 205
15 connects the nozzles 100 to the pipeline 105.

Referring to Figure 3 each nozzle 100 assembly consists of a hollow cone inner
member 301 which is screwed into the manifold 205. Surrounding the hollow cone
inner member 301 is the shroud 204. As stated, the shroud 204 is threaded on its
20 outer surface to accept the clamp nut 203 which retains the nozzle 100 in position in
the double ramp 101.

Referring to Figure 4, the control box 104 consists of an outer weatherproof vented
cabinet 401 in which there is situated a reservoir 402 for disinfectant fluid. Fluid
25 from the reservoir 402 passes via a stop valve and filter unit 403 to a pressure pump
404. The output fluid line 405 from the pump 404 has a portion 406, which is
connected via a pressure relief valve 407 to the bottom of the reservoir 402. The
major part of the fluid flow line 405 is connected via a solenoid outlet valve 408 to a
connection for the pipeline 105 which supplies the disinfectant fluid to the manifold
30 205 and then to the nozzles 100. Connected into the lower part of the fluid flow line
405 is a drainage line 409 and valve 410. The pressure pump 404 and solenoid valve

408 are operated by an electrical control box 410 in response to signals from the
5 vehicle position sensors 106, 107. Power for the pressure pump 404, solenoid valve
408 and control box 410 is supplied by a dual-battery system 411. The reservoir 402
includes a vented refilling pipe 412.

Referring to Figure 5, the electrical control box 410 includes two normally open
10 switches 501, 502 to which are connected the photo-electric cells of the vehicle
detectors 106, 107, respectively. The switches 501, 502 are closed if the light beams

from the emitters of the photo electric vehicles 106, 107, respectively, are interrupted.
15 The switches 501, 502 are connected to relays 503, 504 which control the supply of
power to the pressure pump 404 and solenoid valve 408, respectively. A delay circuit
module 505 is included in the power supply line to the solenoid valve 408 so as to
ensure that the fluid flow line 405 is pressurised fully before any disinfecting fluid is
supplied to the nozzles 100. Also included in the electrical control box 410 is a
20 manually operated switch 506 adapted to by-pass the switches 501, 502 and a
manually operated switch unit 507 which is adapted to enable the pump 404 and
solenoid valve to be operated manually so as to enable the pressure setting, and so
mist curtain height, to be adjusted, or a pressure washing lance to be used via the
drainage line 409 and valve 410.

25 The arrangement described is for one in situations which are temporary or where
mains water and electricity supplies are not available. For permanent installations, or
other installations where mains water and electricity supplies are available, the
reservoir 402 can be arranged to be kept topped up by a conventional ball-cock valve
30 and the batteries 411 can be replaced by a 240/24-volt transformer/rectifier unit.

If main water supply is used, then it is necessary also to provide a subsidiary reservoir
of concentrated disinfectant and a bleed/mixing valve connecting the subsidiary
reservoir to the reservoir 402.

CLAIMS

5 1. An apparatus for facilitating the disinfection of the underside and/or suspension of a vehicle, comprising an array of upwardly directed atomising nozzles, positioned transversely of a carriageway, means for supplying a disinfectant fluid to the atomising nozzles, means for sensing the approach of a vehicle to the atomising nozzles and initiating the supply of disinfectant fluid to the atomising nozzles and means for sensing the completion of the passage 10 of the vehicle over the array of atomising nozzles and terminating the supply of disinfectant fluid to the array of atomising nozzles. (paragraph 4 page 1).

15 An apparatus for facilitating the disinfection of the underside and/or suspension of a vehicle including means for positioning an array of upwardly directed atomising nozzles transversely of a carriageway, means for supplying a disinfectant fluid to the array of disinfecting nozzles, means for sensing the approach of a vehicle to the array and initiating the supply of disinfectant fluid to the atomising nozzles and means for sensing the completion of the passage 20 of the vehicle over the array of atomising nozzles and terminating the supply of disinfectant fluid to the array of atomising nozzles. (paragraph 5, page 1)

2. An apparatus according to Claim 1 or Claim 2 wherein the means for supplying the disinfectant fluid to the said nozzles is adapted so to do at a pressure such that the disinfectant fluid issues from the nozzles in the form of a mist.

25 3. An apparatus according to any of claims 1 to 3 wherein there is included means for reducing the speed of a vehicle as it passes over the said nozzles.

30 4. An apparatus according to claim 4 wherein the means for reducing the speed of the vehicle as it passes over the said nozzles comprises a double ramp in which the said nozzles are incorporated.

5. An apparatus according to claim 4 or claim 5 wherein there is included a double ramp positioned on either side of the said nozzles.
10. An apparatus according to my preceding claim wherein the means for sensing the approach of a vehicle to the array of nozzles and the completion of its passage over the array of nozzles comprises a photo-electric cell and of an associated opposed light source positioned transversely of the said carriageway on either wide of the array of nozzles and so arranged that the interruption of one beam of light initiates the supply of disinfectant fluid to the nozzles and the clearance of the second beam of light by the vehicle terminates the supply of disinfectant fluid to the array of nozzles, the arrangement being such that the same sequence of operations occurs whichever direction the vehicle is travelling.
15. Apparatus according to any of claims 1 to 7 wherein the means for sensing the approach of a vehicle to the array of nozzles and the completion of its passage over the nozzles a pressure transducer situated on either side of the array of nozzles and there is included means responsive to signals from the pressure transducers to initiate and terminate the supply of disinfectant fluid to the nozzles.
20. An apparatus according to any preceding claim wherein the means for supplying disinfectant fluid to the array of nozzles includes a reservoir for the disinfectant fluid, a pressure pump and means responsive to the vehicle position sensors for activating the pump during the period when the vehicle is passing over the array of nozzles.
25. An apparatus according to claim 9 wherein the means for supplying disinfectant fluid to the array of nozzles is adapted to be self-contained and independent of mains electricity and/or water.

10. Apparatus according to claim and wherein the means for supplying disinfectant fluid to the array of nozzles is adapted to be connected to a mains supply of water and there is included a secondary reservoir containing concentrated disinfectant and means for combining a metered quantity of concentrated disinfectant with incoming water to maintain a predetermined concentration of the disinfectant fluid supplied to the array of nozzles.

10

11. An apparatus according to any of claims 9,10 or 11 wherein there is included a solenoid valve in the outlet pipeline from the said pump and means for so controlling the solenoid valve that the disinfectant supply system remains pressurised at all times.

15

12. An apparatus for facilitating the disinfection of the underside and suspension units of the vehicle substantially as hereinbefore described and with reference to the accompanying drawings.



9.



Application No: GB 0116892.1
Claims searched: 1-13

Examiner: Rhodri Evans
Date of search: 25 November 2002

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): A4F

Int Cl (Ed.7): B08B 3/02; B60S 3/04

Other: ONLINE: EPODOC, PAJ, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2242407 A (Chassijet) figure 4 and line 17 page 4 to line 2 page 5.	1-11
X	US 5288334 (Avril) figure 2 and lines 9-30 column 4	1-11
X	US 4889147 (Chandler) figure 1 and lines 43-24 column 4.	1-11
A	CA 1291004 (Khatib) whole document	
X	DE 3026388 A (Riederer) 04.02.82 (see figure 1, WPI abstract accession number 1982-B3057E [06] and last paragraph page 17).	1-11
X	JP 6329002 A (Chiko) 29.11.94 (see all figures and enclosed PAJ abstract)	1-11

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
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